

Defending Wild India



Bombay Natural History Society

Protecting Nature since 1883

BNHS CENTENARY JOURNAL SEMINAR

MESSAGE FROM THE PRESIDENT OF THE BNHS

November 12-15, 2003

It is fitting that the BNHS has chosen the birth anniversary of Dr. Salim Ali to rededicate itself to the defence of wild nature and to redouble its effort to promote good science, the foundation of our Journal, whose 100th Volume has just been published.

The Bombay Natural History Society has a long and distinguished history. From the day it was founded in 1883 its members have been documenting and protecting the rich diversity of the Indian subcontinent.

In following pages you will learn more about this rich history, extracted by Mr. Valmik Thapar from the Journal of the BNHS, which represents the best in natural history, science and nature conservation.

From the earliest days, BNHS members have built this society on an edifice of integrity and credibility. Ours has always been an independent voice, sometimes a lone voice in the wilderness. Fighting to protect our irreplaceable heritage has often been an uphill task, but one that has united some of the finest humans in joint purpose.

Guiding our conservation actions is a core team of extremely talented and dedicated scientists, whose research capability continues to provide our conservation strategy with its keenest edge. With science as the bedrock of the Bombay Natural History Society today, we are uniquely positioned to guide the nation on how to manage its land and water resources, without damaging the fragile ecosystems on which all life is dependent. Nurturing and training young scientists and biologists will always remain a core objective of the BNHS.

Some time ago in my capacity as the President of the BNHS I was privileged to Chair a Central Government Committee entrusted with the creation of a National Wildlife Action Plan for India. This document has been very widely circulated by the Ministry and is going to be the basic blue print for conservation action in India in the years ahead.

But the Wildlife Action Plan cannot possibly be executed in isolation. Wildlife conservation cannot be restricted to national parks and sanctuaries. Areas outside the protected area network are often vital ecological corridor links and if they are not protected, we risk islanding pockets of biodiversity that will be unable to survive in the long run. While wildlife experts and protected area managers have been saying this for many years, perhaps the time has come for all categories of decision makers to accept that land and water use policies will have to be re-framed to protect ecologically fragile habitats and regulate the use of natural resources within sustainable limits.

I am happy to note that significant steps in this direction have started to be taken. Some recent developments concerning the implementation of our wildlife laws and policies that are worth mentioning are the appointment of a Central Empowered Committee by the Supreme Court of India. The GEC has been entrusted with the responsibility of assisting the Supreme Court in safeguarding our priceless and irreplaceable wildlife assets. It has already investigated scores of matters.

A National Forest Commission has also been set up, headed by a former Chief Justice of the Supreme Court, Justice B.N. Kirpal, whose environmental priorities are best reflected in the many sage judgements he had delivered.

The recent changes in the Wildlife (Protection) Act, 1972 were supported in an extremely positive and non-partisan way by Members of Parliament of all political parties. These changes have been widely acknowledged by experts, officials and even human rights groups to be a vast improvement on the older legislation. For the first time we have, for instance, added a category called Community Conserved Reserves, which will encourage a large number of local communities to lend their purpose and genius to the task of protecting our wildlife.

But all is not smooth sailing. By some estimates perhaps over Rs. 50,000 crores annually may be extracted, legally or illegally, from forest lands alone! We know that less than Rs. 500 crores is ploughed back each year for real protection of this natural diversity. Alarming, insurrectionist and separatist groups have taken advantage of ineffective and inadequate government mechanisms, to generate funds from forests and from the trade in wildlife contraband to finance their anti-national agenda.

Clearly we need to take urgent steps to increase the financial allocations for the conservation of our forests and wildlife, and rejuvenate our nation's political will to make this happen. One of the most important messages that can be sent to make this possible is to highlight the role of forests in providing water. We will be looking towards the many scientists and field biologists who have travelled from afar to attend this Centenary Journal Seminar, for help to achieve this task.

As you are all aware, this is the 30th anniversary of Project Tiger. India has reason to be proud of the fact that, despite dire predictions, the future of the tiger is reasonably secure within our borders. Across the world heads of states and governments have communicated their appreciation, even admiration, for India because we have proved that protecting the tiger, a global symbol for nature, is an article of faith for us. In return, the tiger gives us one of the most precious commodities in the world – fresh water from over 300 large and small rivers that originate in tiger habitats.

The BNHS vision for the next Century is to continue with our tradition of using good science to protect, conserve and restore wild habitats and the environment of our great country. This we believe will eventually lead to an improved quality of human life.

Nothing can demonstrate this fact better than the manner in which Borivli's Sanjay Gandhi National Park – which was declared a protected area thanks to the efforts of the BNHS and stalwarts such as the late Humayun Abdulali – supplies millions of citizens of Mumbai with fresh, clean water. The Society has always worked to protect this park in whose dense periphery our highly popular Conservation Education Centre is located. We will do so in the future as well.

I call upon all citizens across India to join the BNHS and be a part of our scientific and conservation mission.

Mr. B.G. Deshmukh
President, BNHS

Defending Wild India



CONTENTS

HISPID HARE	4
Conservation of the endangered hispid hare and tall grassland habitats in Jaldapara.	
LITTLE ANDAMAN	7
The future of the Onge people and their forests is intertwined.	
HUMAN DAM	10
Ecological and Social Viability of the Human Dam Project	
JBNHS 100 VOLUMES	12
The role of the BNHS in Indian conservation selected from the Journal of the BNHS.	
THE SATPURAS	18
Protecting this vital tiger landscape is still possible	
URANIUM MINING	20
Can we risk our wildlife and water supplies?	
CORBETT	22
Enforcing the law to protect our wildlife	
TUNGARESHWAR	24
Saving this forest ensures our water security	
GULF OF KUTCHH	26
Ecological security or economic profit?	

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Conservation of the Endangered Hispid Hare

AND TALL GRASSLAND HABITATS IN JALDAPARA WILDLIFE SANCTUARY, WEST BENGAL

Text and photographs by Gopinathan Maheswaran

As a scientist with the Bombay Natural History Society I have been privileged to work and travel through some of the most exquisite areas on this planet. There can be no denying my personal love and fascination for nature, but perhaps even more predominant within me is a desire to understand the origin of species, their survival techniques and the new threats posed to them from anthropomorphic pressures. In the days ahead I hope to use such knowledge to work with others seeking to protect wild nature. This I believe is in the national interest. It is also clearly in the interests of a planet besieged

by all manner of woes including climate change, species decline and pollution at a never before imagined scale.

What I would like to share on these pages with readers is my understanding and concern regarding the fate of the Hispid hare *Caprolagus hispidus*, a globally endangered lagomorph (IUCN 1996). It is been listed as Endangered and included in the Schedule I of the Indian Wildlife (Protection) Act, 1972. In fact, the Hispid hare is one of only two lagomorph species listed by CITES, the United States Endangered Species Act,

and the IUCN Red List (CITES-Appendix I; U.S.EA-Endangered; and IUCN-Endangered criteria A1c+2c, B1+2abode, C1).

In 1971, a live Hispid hare was captured in Barnadi, Assam in India, thereby ending the speculation that the species had gone extinct. There have been very few published records of captures or positive sightings of the Hispid hare since the original type specimen was described by Blyth in 1845. Several authorities (e.g. Gee 1964) feared, the species had gone extinct until its joint rediscovery with the sympatric Pygmy hog (*Sus salvanius*) in northern Assam of India in 1971 (Malinson 1971; Tessier-Yandell 1972).

Subsequently, a BNHS study (in 2000-2001) demonstrated conclusively the dependence of the threatened Hispid hare (*Caprolagus hispidus*) on native tall grassland habitat of Jaldapara Wildlife Sanctuary in northern West Bengal. Jaldapara Wildlife Sanctuary (216.51 km²), an ecologically sensitive ecosystem is located in the flood plains of the river Torsa and other small rivers, which have created large tracts of savanna grasslands sustaining a small population of One-horned rhinoceros (*Rhinoceros unicornis*) and Hispid hares. Recent inventory study (funded by the SANGF of the BNHS) on the small mammals (rodents and shrews) of Jaldapara Wildlife Sanctuary revealed the occurrence of Belanger's Tree Shrew *Tupaia belangeri*, Grey Musk Shrew *Suncus murinus*, Himalayan White-toothed Shrew *Crocidura attenuata*, Indian

Bush Rat *Golunda elliotii*, House Rat *Rattus rattus* and Fawn-coloured Mouse *Mus cervicolor* with in the Sanctuary and chances of encountering many more species may not be ruled out. Grasses such as *Saccharum naranga*, *S. arundinaceum*, *S. spontaneum*, *S. longistromium*, *Imperata cylindrica*, *Phragmites karka*, *Heteropogon contortus*, *Arundo donax*, and *Themedeia* Spp. are more common within the Sanctuary.

The habitat that best supports Hispid hare populations is characterized by an intermediate understory cover (between 25-35%), low tree cover (thus favoring the growth of native grasses), and large and unfragmented grasslands that can be used as feeding grounds. However, this habitat type is disappearing or being altered dramatically due to three separate activities: overgrazing by domestic cattle, unsustainable thatch grass cutting, and dry season burning. The resulting habitat loss has led to the classification of the Hispid hare as being in danger of extinction.

In our study, we also investigated Hispid hares in the neighbouring Buxa Tiger Reserve. Hispid Hares were reportedly present in the Buxa Tiger Reserve in the mid-1980's. At that time a small population persisted in spite of the already degraded grasslands caused by overgrazing of domestic cattle. However, despite intensive searches for Hispid hares in the few remaining patches of tall grassland of the Bala, Balapara and Kalkut Rivers of the reserve, we found no evidence of Hispid hare. And we must remember that our census in

A BNHS study in 2000-2001 demonstrated conclusively the dependence of the threatened Hispid hare (*Caprolagus hispidus*) on native tall grassland habitat of Jaldapara Wildlife Sanctuary in northern West Bengal.





Pellet counts helped estimate hispid hare densities

Jaldapara Wildlife Sanctuary yielded a population estimate of only 25-30 Hispid hares, a number of animals highly prone to extinction processes. In Jaldapara, construction of roads and fire lines has taken its toll on the grassland fauna. For the easy movement of camp elephants and bullock carts carrying grasses for camp elephants, non-metal roads have been built, which in most areas traverse through the large grass patches, thereby preventing the movement of species like Hispid hare which always prefer thick ground cover. Absence of suitable corridors between two grassland patches proved to be a deterrent, especially during summer or grassland burning season. According to Diana Bell of the University of East Anglia, United Kingdom, there is strong evidence that widespread cutting and burning of tall grasslands has been deleterious to less mobile species and species less tolerant of disturbances, including Pygmy hog and Hispid hare.

In Jaldapara, the Forest Department has taken up the task of planting palatable grass species in more areas as fodder to camp elephants. Even though some of such patches have grown enough and are ready to be harvested, they hardly provided any support to Hispid hares both in terms of food and shelter. The distance between two grass clumps was large, and the open space in between played a negative role in terms of protection to hares. Large open areas may be barriers or at least deterrents to movements of rabbits, and this was true for Hispid hares in Jaldapara Wildlife Sanctuary. So the hares that want to disperse out may not be able to reach a suitable alternative patch especially during the grassland-burning season. The Principal Component Analysis (PCA) result shows that ground cover, short vegetation and tall vegetation together determined the movements of Hispid hares in Jaldapara. Apart from these, disturbance also played a role to some extent, clearly depicting the picture of hare abundance only in the place where disturbance in terms of grass cutting and burning was less. Therefore, we expected to find higher hare densities in the habitats where feeding grounds (grasslands) and natural undisturbed understory were more abundant than in habitats where grass and/or protection availability was low in habitats, which had been transformed by humans. Natural processes of succession resulted in the conversion of a few grasslands into woodlands, which basically reduced the utilisable habitat of species like Indian One-horned Rhinoceros *Rhinoceros unicornis*, Hog deer *Axis porcinus*, and Hispid hare.

Recommendations

Each of the three factors mentioned above are responsible for the decline of the grasslands preferred by Hispid hares and must be addressed in order to ensure survival of the species.

- Grazing by domestic cattle in wildlife sanctuaries or reserves should be reduced or eliminated.
- Cutting of the native tall grasses by locals for thatch and fodder, is indiscriminate and widespread. This practice often results in the removal of whole grass clumps, thereby reducing the ground cover. In order to reduce the pressure on the grasslands, the number of camp elephants of the sanctuary be reduced.
- There should be a change in the pattern of grassland burning. Currently, the season for burning the grasslands coincides with the breeding season of the Hispid hare, and the fires not only destroy habitat, but reduce the reproductive potential of the species.
- A major difficulty to achieving these recommended management decisions is the lack of knowledge about Hispid hares in the region. An active educational campaign should be undertaken to ensure that the staff of the Sanctuary are aware of Hispid hare and its importance.

Each of these suggested changes in management of the grasslands within wildlife sanctuaries and reserves in northern West Bengal may have negative economic repercussions. Local people have come to rely on the use of these areas for their livelihoods. However, solutions must be found to allow changes to be made to protect Hispid hares and other native wildlife in these areas, while still providing local people with a means to benefits these habitats provide.

FACTS

- The Hispid hare was rediscovered along with the sympatric Pygmy hog (*Sus uhuensis*) in northern Assam in 1971.
- Hispid hare *Caprolagus hispidus* prefers only wet, tall (more than 1.5 to 2 m tall) grassland habitats in *Tera* and *Duar* in India.
- Wet, tall grassland habitats are disappearing or being altered dramatically in India due to three separate activities: overgrazing by domestic cattle, unsustainable thatch grass cutting, and dry season burning.
- Present known distribution in India: Terai grasslands in Uttar Pradesh, especially the Dudwa National Park and wet, tall grasslands in Jaldapara Wildlife Sanctuary, West Bengal.
- Possibly exterminated from Buxa Tiger Reserve, West Bengal, where it was known to have occurred in mid-1980's.
- The estimated population (2000-2001) of Hispid hare in Jaldapara Wildlife Sanctuary is 25-30 individuals- a number of animals highly prone to extinction processes.
- Listed as Endangered and included in the Schedule I of the Indian Wildlife (Protection) Act, 1972.
- The Hispid hare is one of only two lagomorph species listed by CITES, the United States Endangered Species Act, and the IUCN Red List.

Little Andaman Interdependence

The forests of Little Andaman were saved from the axe thanks to the Onge. Now the forests are helping the Onges to survive. *by Pankaj Sekhsaria*

This is a pristine tropical rainforest that harbours a huge diversity of biological wealth. It's a patch that's hardly been surveyed, leave alone documented for its wealth and riches. It has beaches on which endangered sea turtles have been nesting for aeons and has creeks and mangroves that are infested with the finest specimens of salt-water crocodiles. The forests here are home to innumerable species of plants and animals, including endemics like Andaman Day Gecko *Phelsuma andamanese*, Andaman Serpent Eagle *Spilornis elgini*, Andaman Teal *Anas gibberifrons* and Andaman Wild Pig *Sus scrofa andamanensis*. The latter two being, in fact, on threatened lists of the IUCN. It is clearly a biological hot spot and importantly, also the

home of a remarkable, but very vulnerable and threatened human community.

This is the 720 Sq. Km island of Little Andaman, one of largest in the Andaman & Nicobar group located in the Bay of Bengal. The chunk of forest mentioned is the Onge Tribal Reserve of Little Andaman and the people in question are the Onge, a small community of negrito origin for whom the tribal reserve was created in 1957. Had it not been for the fact that the forests had been 'kept aside' for the Onge, they would almost certainly have been logged to death by now.

This is a pristine tropical rainforest that harbours a huge diversity of biological wealth. It's a patch that's hardly been surveyed, leave alone documented for its wealth and niches. Destroying it is akin to burning a library without documenting its contents.



Total A&N geographic area:	8,249 sq. km.
The Andaman group:	6,408 sq. km.
The Nicobar group:	1,841 sq. km.
The forest area:	7,170.69 sq km
Total islands:	349
Inhabited islands:	38 (24 in the Andaman group and 12 in the Nicobar group.)
Total villages:	547
Indigenous people:	Sentinelese, Jarawa, Onge, Great Andamanese, Nicobarese, Shompen

The 520 sq. kms. Onge Reserve however does much more than just protecting the lands of and for the Onge. It performs a critical role for biodiversity conservation, one that is as important as the protected area network in the islands.

Here are some important statistics. The total land surface in the Andaman Islands is a little more than 6000 sq. km. There are over a 100 protected areas that have been created here under the Wildlife (Protection) Act of 1972. The area thus protected is about a 1000 sq. kms, 50% of which are the marine protected areas of the Mahatma Gandhi and Rani Jhansi National Parks. The total forest area, therefore protected under the WLPA amounts to about 500 sq. km., roughly the size of the Onge Reserve. The largest of these protected areas is the 133 sq. km., Interview Island.

It is extremely significant to add here that the tribal reserve on Little Andaman is not the only large landmass protected in this manner. There is an even larger, more than 700 sq. km Jarawa Tribal Reserve spread over the two main islands of South and Middle Andaman. Like the Onge Reserve, the forests of the Jarawa Reserve too are extremely rich and have been protected by the Jarawas from any extractive and destructive outside intervention.

In the conflict ridden conservation landscape of the country, here is an example where the needs of biological and

TERRESTRIAL BIODIVERSITY

Particulars	Species	Endemism
Flowering Plants	2500	223
Mammals	52	33
Birds	244	18
Reptiles	76	24
Amphibians	18	3
Land Mollusc	110	77
Arachnida	94	38
Hemiptera	146	22
Diptera	214	24
Coleoptera	878	92
Lepidoptera	426	52
Isoptera	40	19
Odonata	36	4
Annelida	30	9

environmental conservation and those of human communities come with a neat overlap. The Onges have lived in harmony with their forests and natural resources for a few 1000 years. It is an example that we could also learn from, an example that we should seek to emulate. However, if one looks at the history of these islands over the last four decades or so, one gets a completely different picture.

The case of Little Andaman and the Onge is extremely illustrative. In 1998 a study by Kalpavriksh, that was funded by the Conservation Wing of the BNHS revealed shocking evidence of the violation of the forests and the tribal reserve of the Onge. The Onge Tribal Reserve had been created in 1957, when the entire island of Little Andaman was reserved under the Andaman and Nicobar Protection of Aboriginal Tribes Regulation (ANPATR), 1956. The forests were protected and so were the Onge. In the 70s, however, two denotifications were effected. Nearly 200 sq.

MARINE BIODIVERSITY

Particulars	Species	Endemism
Mammalia	7	-
Reptiles	12	-
Fishes	1,200	2
Corals	200+	?
Echinodermata	350	4
Mollusca	1,000	18
Crustacea	600	6
Polychaeta	184	4
Anthozoa	326	2
Porifera	72	-
Meiofauna	490	102

km. of the forests were taken out of the tribal reserve and handed over for large scale clearing for settlements and conversion of forests into agricultural lands and plantations of exotics like red oil palm and a huge timber extraction operation. The Onge, their rights and their need of the forests, for their own survival too, were completely ignored.

The consequences are visible for all to see. Large chunks of the forests are gone, many turtle nesting beaches have been completely mined away, large scale erosion from deforested areas has smothered the adjoining coral reefs, the crocodiles have been hunted and so have the Andaman Wild Pigs.

The denotification of the tribal reserve and the destruction of the forests have not just impacted the wild wealth of the islands, it has severely impacted the Onge themselves, an ancient people who are slowly but surely, being pushed to the brink of extinction.

It is now clear that the protection of the human community here is as vital for the survival of the forest, as the protection of the forest is for the survival of the Onge. Unless this is understood and acted upon there is little chance, either for the Onge, or for the forests of Little Andaman and other important islands in the Andaman. A small beginning has indeed been made. In a significant order passed by the Supreme Court of the country



The protection of the Onge tribals is as vital for the survival of the forest, as the protection of the forest is for the survival of the Onge.

in May 2002, commercial exploitation of forests from the Andaman Islands was stopped for the first time after a century of operations. The issue of encroachments of forest and tribal lands is being dealt with, the court has asked for measures to restrict and eventually stop the large scale immigration of people from mainland India to the islands, sand mining is being phased out and the threat from exotics to the forests is also being dealt with.

This, however, is only a beginning. Significant progress can only be achieved when the lands and forests of the Onge and Jarawa are protected at all costs, even restored to them where they were taken away. There has to be an explicit recognition of their tribal way of life, a respect for their traditions, their knowledge and an acknowledgement that they are our most important partners in the conservation of an unique natural heritage: the forests of the Andaman Islands

ORDERS OF THE SUPREME COURT

In 1999, the Society for Andaman and Nicobar Ecology (SANE), along with Kalpavriksh and the BNHS filed an intervention in the Godavarman (Forest) case in the Supreme Court in the matter of the forests and indigenous people of the

Andaman & Nicobar Islands. After detailed deliberations which included the appointment of the Shekhar Singh Commission to make recommendations in the matter, the Supreme Court passed landmark orders related to these islands in 2002. These include:

- Stoppage of all commercial timber extraction operations from the natural forests in the islands
- A ban on transport of timber from the islands to any part of the country
- Shutting down of the Andaman Trunk Road in those parts where it runs through or along the forests of the Jarawa Tribal Reserve
- Declaration of the islands as an Inner Line Area to deal with the serious problem of continued immigration of settlers from mainland India to the islands
- Closing down of the Andaman & Nicobar Forest Plantation and Development Corporation
- Phasing out the existing monoculture plantations of red oil palm, rubber and teak
- Removal of encroachments; and
- Phasing out of the sand mining operations from the beaches of the islands; promotion of appropriate materials and technologies for construction and regulation of tourism development in the islands.

Unfortunately, however, though more than a year has passed, some of the key orders continue to remain unimplemented by the Island Administration. These include the closure of the Andaman Trunk Road and the declaration of the islands as an Inner Line Area. The local administration is sadly losing an historic opportunity to ensure the long term survival of the forests of the indigenous peoples of these islands.

RECOMMENDATIONS/ALTERNATIVES

Andaman Trunk Road	Water transport
Poaching	Better patrolling, Better Coordination
Sand Mining	Stone Dust and timber (for local use)
Tourism	Need of tourism plan based on carrying capacity
Migrants	Declare Islands as an Inner Line Area and Islanders I cards
Shipping	Make it more efficient
Exotics	Complete eradication

Ecological and Social Viability of the Human Dam Project in Vidharba

by Depak Apte

The proposed Human (pronounced hooman) Dam is a major irrigation project slated for construction across the Human River in the Wainganga-Godavari basin, near the Sirkada Village in the Sindewahi Tahsil of Maharashtra state. The Human is a tributary of the Andhari River, which ultimately joins the Wainganga.

The Irrigation Department of Maharashtra had prepared a project proposal for this dam for which it received administrative approval as far back as 1983. The proposed project seeks to divert 132 MM³ of water to MSEB's Chandrapur Thermal Power Station, out of its dependable yield of 438.29 MM³. Subsequently, it was decided to divert this water to the Andhari river project by way of a proposed Right Bank Canal (RBC) of the Human Project. The project also involves diversion of 2906.26 hectares of forest land and therefore needs both forest and environmental clearances from the Ministry of Environment and Forests (MoEF).

The Forest Advisory Committee of the MoEF suggested reducing the submergence by lowering F.R.L. so as to reduce the total forest area submerged. The project authorities agreed to a reduction of one metre, which would bring down the forest submergence from 2906.26 ha to 1535.85 ha. On this basis, the MoEF gave the site clearance to the Irrigation Department to enable it to conduct the required surveys and investigation.

The Conservation Department of BNHS was concerned that the area in question would be damaged and that the ecological impact on the tiger would be too great. It therefore conducted independent ecological and social impact studies of the Human Project, from which the following issues emerged:

1. **Submergence of the narrowest wildlife corridor:** The 15 villages under full submergence lie in and around the narrowest corridor connecting the Chandrapur and Brahmपुरi Forest Divisions. The area adjoining the submergence zone on the west bank is a reserved forest, which falls in Chandrapur Division. This area is contiguous with the Tadoba-Andhari Project Tiger to the west and the boundary of the proposed reservoir would be a mere 3.2 km. from the tiger reserve.
2. **Water Availability:** Each village in the area has a functioning village pond, locally called a 'Bowdi'. These are perennial water bodies. Thus the issue of water scarcity seems to have been exaggerated.
3. **Existing pressures on Tadoba-Andhari Tiger Reserve (TATR):** At present there are several villages around TATR. The impact of livestock from these villages is clearly visible in Kolsa Range where more than 3,000 cattle graze. This livestock competes not only for grass, but also for limited water, especially in summer. The submergence area of Human Dam is 4.25 km from

The forests of Tadoba and Brahmपुरi were once contiguous. Today they are connected by a 'chicken's neck' strip of forest. It is precisely in this narrow gene passage that the Human Dam is sited. If this is allowed, the future of the tiger, gaur and associated mega fauna will be sealed.



SOURABH BANSAL/BNHS

Tadoba N.P. boundary and 3.2 km from TATR. In many villages, large tracts of land are to be submerged and this can only serve to exert additional pressure on TATR for fuel wood and grass.

4. Legal aspects and violations

(a) **Construction of the colony and sub-bund:** As part of the Human Project, a housing colony was partially constructed at Nawargaon in the early 1980's and work on a sub-bund for the project was also completed prior to 1985. How was this work undertaken in the absence of Central Government clearances?

(b) **Public hearing:** The public hearing for the Human project was reportedly held on November 26, 1999 at the Collector's office. However, since the EIA report was only prepared in December 2001, one wonders on what basis the public hearing was conducted (two years before the EIA report was prepared). As per the Environment Protection Act (EPA), the EIA must be prepared prior to the public hearing. This renders the hearing invalid.

5. **Full utilization and maintenance of existing village ponds, lift irrigation projects and minor irrigation projects:** The BNHS survey team visited several existing irrigation projects in both the submergence and downstream areas of the project, from traditional village tanks and ponds to minor irrigation and lift irrigation projects. Additionally, many of the minor irrigation projects already constructed are still not fully utilized. This suggests that a combination of minor irrigation and lift irrigation projects can fulfil the needs of the command area. Many of these projects have cropped up after the Human project was mooted and this brings into question the need for the Human Dam in the first place.

EXISTING EIA AND CRITIQUE

Analysis and review of benefits and costs due to the dam as proposed in the Environment Impact Analysis Report for the Human Dam

The EIA report produced by the project authorities has several serious shortcomings and flaws.

- The report omits to mention the proximity of the proposed project to the Tadoba-Andhan Tiger Reserve and thus ignores its impact on the tiger and its habitat.
- The National Wildlife Action Plan and the letter issued by MoEF in 2002 state that areas within 10 km. of PAs and wildlife corridors should be declared eco-sensitive under the EPA. The construction of a large dam would violate this official government policy.
- No studies were conducted on the impact of the dam on riverine flora and fauna.

Total submergence area	: 6173 ha
Revenue land	: 528 ha
Private land	: 4109 ha
Forest land	: 1535.85 ha
Villages under full submergence	: 15
Villages under partial submergence	: 24
Populated affected	: 14,600
Right bank canal (RBC)	: 84.10 km.
Left bank canal (LBC)	: 50.70 km.
Project cost	: Rs. 423 Crore
Total felling of trees	: 1,50,791
Catchment area	: 1,03,300 ha out of which 37% is forest area.
Forest type	: Southern Tropical Dry Mixed Deciduous forest
Proximity of protected areas	: Tadoba National Park is 4.25 km and Andhan Sanctuary is 3.2 km from submergence area

- The EIA Report says that no rare and endangered species of flora and fauna are found in the area. This is patently incorrect and is contradicted in the report itself, which acknowledges that the project site is home to tiger *Panthera tigris*, leopard *Panthera pardus*, gaur *Bos geurus*, chital *Axis axis* and other species, which a professional, detailed study will reveal.

CONCLUSION AND RECOMMENDATIONS

It is the considered opinion of the BNHS that the Human Dam Project must not be allowed to proceed in its present form, on account of the adverse environmental impact it would have on the region's forests, wildlife and biodiversity. We recognize, however, that the genuine requirement of the local population must be met sustainably and in a manner that is socially just. Towards this end we have proposed the following alternative development options for the proposed catchment, submergence and command areas of the Human Project, which may eliminate the need for such a destructive project by delivering comparable benefits to the local populace at a fraction of the planned cost of the Human Dam, without the attendant ecological damage.

- i. Existing village tanks and ponds should be de-silted to increase their storage capacity.
- ii. Farmers should be provided economic assistance and technical know how to reduce distribution and evaporation losses.
- iii. Existing lift and minor irrigation projects should be utilized to their fullest capacity.
- iv. Dredging and de-silting operations and catchment area treatment should be undertaken to prevent siltation of existing reservoirs.
- v. A district-wide drive should be undertaken to identify sites for small check dams and water conservation structures. Such measures will provide employment, even as they enhance the water table and the water and food security of the region.

**A
TRIBUTE TO THE
CONSERVATION TRACK
RECORD OF THE BNHS**

**Based on Journal extracts
selected by Valmik Thapar**

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- Dr. D. Macdonald • Mr. A. Johnston • Dr. Subhasan Arjan
- Mr. E. H. Allison • Col. C. Swinhoe • Dr. Anwarun Pindurong
- Mr. J. C. Anderson • Dr. G. A. Minnaeche



Victoria and Albert Museum, Bombay



H. M. Phipson

Joined the Society in 1886. And was its backbone for almost two decades.

In April 1891, H. M. Phipson wrote to the government and stated

"... the government should pass a special act with a view to establishing a Close Season during which all indigenous birds and harmless wild animals should be protected."



Col. F. W. Wall

Joined the Society in 1895. Pioneered scientific research on Indian Serpents and continued to undertake field work for three decades.



W. S. Millard

Joined the Society in 1906 and launched the much needed mammal survey of India, Burma & Ceylon between 1911-1914.

- Millard played a remarkable role in initiating amendments to the proposed Indian Game Act of 1908.
- The BNHS now got herons and kingfishers protected since the demand on their feathers was enormous.

Another BNHS member P. T. L. Dodsworth added his voice to the issue of illegal trade. In 1910, he campaigned for the government of British India to:

- prohibit the export of plumage from one Indian port to another.
- to prohibit the possession in India of birds skin and feathers.

He fought these battles because June 1907 had seen the cataloguing for auction of 20,000 kingfishers in London.

Mammal Survey of India, Burma and Ceylon (1911-1923)

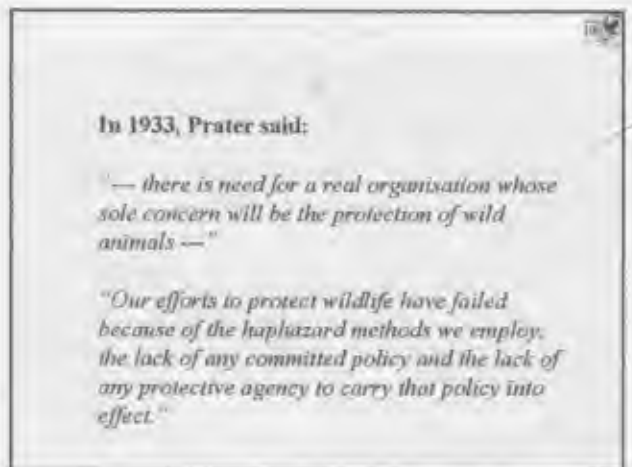
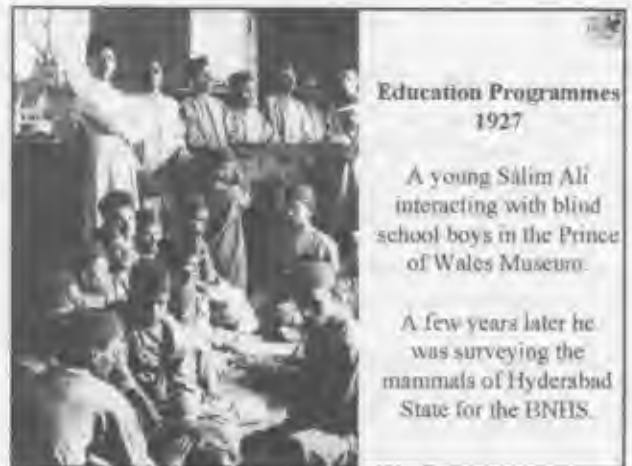
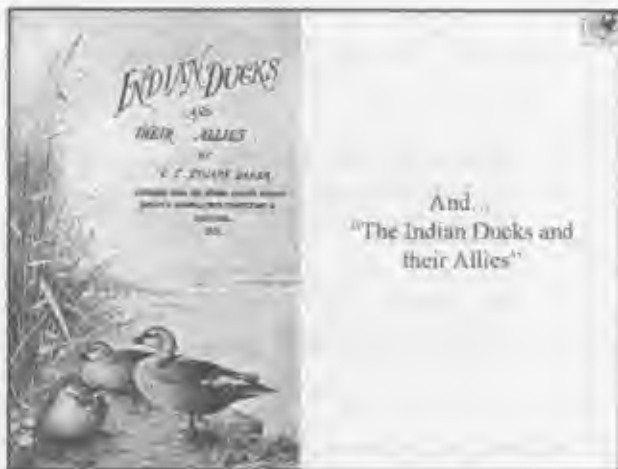


Mammal Survey (1921)



E. C. Stuart Baker

Famed ornithologist of the day, his superbly illustrated papers were published as "The Game Birds of India" in 1921.



The Golden Jubilee of the BNHS (1933)



Between 1875 and 1925, as many as 80,000 tigers were killed in India alone



A. A. Dunbar Brauder, an extraordinary conservationist wrote in 1933:

"the motor car - this is perhaps the biggest factor of all in the disappearance of game ---"

"every car that moves by day or night has one or more guns in it"

"the destruction is terrible"



The famous F. W. Champion fought to stop hunting from cars, tried to limit gun licenses and prohibit the sale of *shikar* trophies.



In 1934, Champion wrote in the pages of the JBNHS:

"Frankly, the position is appalling. The vast increase in gun licences which has taken place in recent years, combined with the greatly improved means of transport, has caused a drain on the wildlife of the districts such as can end only in the almost complete destruction of any kind of wild creature considered to be worth powdered and shot."

R. C. Morris was a great fighter for the southern forests and in 1935 stated:

"—I consider that chital, blackbuck and chinkara have certainly decreased to a dangerous extent and will be extinct in South India in not many years —"

He fought hard for the creation of national parks and special staff to go with it.

In 1935, Salim Ali completed a survey of wildlife of Hyderabad state and said:

"... at the back of all this senseless slaughter and law breaking which has brought about the present sorry plight is the upathy of public opinion towards the need for the preservation of our fauna."



S.H. Prater's book in 1948 on Indian Mammals remains a landmark publication in the field of natural history till date.



Lt. Col. R. W. Burton

With BNHS, he spearheaded the battle to save independent India's wilderness - 1948.

World War II was over.

Burton was a great post independence campaigner for a separate wildlife department and staff. He stated:

"The years are passing. This great national asset is wasting away. It is the duty of every government to protect it for posterity. The urge should come from the highest levels."

"Without a wildlife department as suggested herein the survival of much of the wonderful wildlife of India is inconceivable and a great national asset will disappear never to be regained, as the majority of the unique species will become extinct."

Dr. Salim Ali on a field trip in the Great Rann of Kutch (1950)



Humayun Abdulali

Honorary Secretary of the Society from 1950 to 1962 and served on the Executive Committee till he died on 3rd June, 2001.

Through Abdulali, BNHS created the Bombay Wild Animals and Birds Act in 1951.

E. P. Gee angling on the river Mamas

Spearheaded conservation strategies in 1950s and early 60s.



In Gee's words (1952):

"the gradual extermination of wildlife in India has now reached a stage when it is of the utmost importance that the exact status of wildlife sanctuaries should be reviewed and ---"

He also fought for a separate department for wildlife and for a special staff.

"officers in charge of sanctuaries or national parks should be specially selected for these appointments."

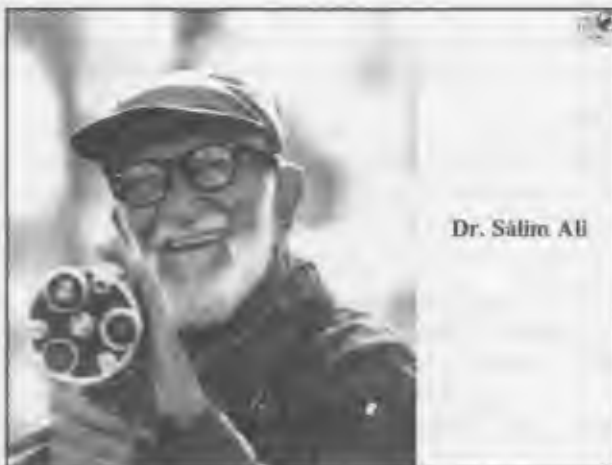
"there is no point in passing resolutions and making laws if they can not be enforced."

- In 1966, Juan Spillet was engaged by BNHS to survey India's wildlife.
- He travelled 13,500 miles across India's forests with 300 miles on foot and 21 days on the back of an elephant.
- He felt there were two vital problems – too many people and too much grazing livestock!
- In the same year Indira Gandhi came to power.

At the BNHS Centenary Function (1983)



- By 1990, the Gandhis had gone. India's wildlife nightmare had begun. It still continues...
- But it would have been worse without the sacrifice of our forest staff.
- ... and the intervention of the Supreme Court.
- Good science, coupled with sharp interventions from conservationists are needed to defend our wilderness. This strategy must define the BNHS mission in the decades ahead.



Dr. Salim Ali

SAVING THE SATPURA TIGER LANDSCAPE

by Kishor Rithe

I am a BNHS member and I believe that the Society has a sacred task ahead of it. While the rest of the world continues with business as usual, it is we who must be the keepers of Eden. It is left to us to defend India's vanishing wilds and to protect the myriad species, including the recently re-discovered Forest Spotted Owlet (*Athene blewitti*), that seem to be headed firmly towards extinction.

I have watched tigers (*Panthera tigris*) in Melghat and have trekked through the rocky margins of the Pench River in the tiger reserve of the same name. I have ranged as far as Kanha and Bandhavgarh and I know that the entire belt is alive with wildlife and that a little effort now will result in a magical regeneration of wild species small and large.

With a group of student many years ago I participated in long *pad yatras* (walking campaigns) through the Satpura mountain ranges, seeking public support for one of the oldest mountain chains in the world that run parallel to the Vindhyas in Central India. The time has come for us to relaunch such initiatives so that the people who live here are made aware of the immense wealth they may lose if they allow others to plunder their heritage.

By profession I am a teacher, but my life is now devoted to protecting nature. In the course of my travels I have had to fight miners, road builders and sundry contractors, with greater frequency than I have had to deal with poachers and wildlife traders. To my mind, the former are the more difficult to counter.

I am unashamedly in love with the tiger. And it will come as no surprise to readers to know that the Satpura mountain chain has been categorized TCU-1 (Tiger Conservation Unit One) area by the Wildlife Conservation Society and WWF-India. When tigers have vanished from most of India, I believe, the deep ravines, hidden valleys and extensive forests of the Satpuras will continue to support tigresses and their cubs. I look at my battle to protect this wilderness as one with the global effort to save the tiger and all the species that share and comprise its secret world.

The slopes and valleys of the Satpuras are home to probably the largest remaining contiguous tiger habitat in the world. Since 1999, Bombay Natural History Society (BNHS), the Nature Conservation Society, Amravati and the US Fish & Wildlife Services have jointly worked to assess the status and contiguity of tiger habitat in the Satpura region. In the process we have constantly had to engage in major conservation battles to save this unique landscape.

The Satpuras are defined as part of the Central Indian Highlands in the Deccan Biogeographic zone of India. This large

and continuous tiger belt includes 13 existing PAs covering an approximate area of 6,500 sq. km. Tigers, of course, range far outside the boundaries of national parks and sanctuaries and reports suggest they currently occupy 10,000 sq. km. of forest lands in the Satpuras. Protecting and regenerating this tiger haven is vital to the battle to save the species.

Satpuras: India's wild gene bank

The Satpuras support a variety of life forms. Champion and Seth (1968) identified the two predominant forest types occurring here as the South Indian Moist Deciduous Forests of the northern Satpuras and the Southern Teak Dry Deciduous Forest. Globally important populations of some of Asia's rarest animals and birds including the Forest Spotted Owlet *Athene blewitti*, Green Munia *Amandava formosa*, Tiger *Panthera tigris*, Rusty Spotted Cat *Felis rubiginosa*, Caracal *Felis caracal* and Barasingha *Cervus duvauceli* are to be found here.

The northern Satpuras harbour an endangered arboreal mammal, the Indian Giant Squirrel *Ratufa indica centralis*. Other mammals include Common Giant Flying Squirrel *Petaurista petaurista*, Palm civet *Paradoxurus hermaphroditus*, Ratel *Mellivora capensis*, Indian Porcupine *Hystrix indica* and Otter *Lutra persipicillata*.

The Satpuras feed 50 rivers.

Danger in paradise: Prime threats include dams, mines and hydel projects, logging, Forest Development Corporation of Maharashtra (FDCM) monoculture plantations, poaching for wildlife derivatives, the trend towards the denotification of PAs, encroachments on forest land for agriculture, illegal grazing and fires. These varied forces seem to be conspiring to split the Satpura tiger habitat into small compartments, which would inevitably lead to fragmentation and eventually, local extinction.

DAMS

Chikaldhara Pumped Storage Project: This proposed project on the boundary of the Melghat Tiger Reserve threatens to drown over 100 ha. of tiger habitat. The area is prime deciduous forest and is frequented by both tigers and leopards.

The Upper Tapi Stage II Project: A second dam is also being proposed in Melghat - the Upper Tapi Stage II Project, which threatens to drown another 244 ha. of tiger reserve area and an additional 1,673 ha. of forest land in Maharashtra, including a part of the denotified portion of the Melghat Sanctuary.

The Bawanthadi Dam (Rajiv Sagar Interstate Irrigation Project): The location of the dam, the resultant reservoir and



The Bawanthdi Dam threatens to disrupt the fragile corridors between Pench, Kanha and Nagzira in the Satpura tiger landscape.

some of its canals are in the corridors connecting Pench to the Nagzira Sanctuary. Tiger habitat continuity between the Pench Tiger Reserve in the Satpura range (both in Maharashtra and Madhya Pradesh) with the Kanha Tiger Reserve in the Maycal range is through this forest belt in the northwest Balaghat forest. These corridors will be almost totally destroyed by this project, which envisages the construction of a 348 m. high dam and over 100 km. of canals. An estimated 2,350 ha. of forest land will be lost in both states and 11 villages will be displaced.

DENOTIFICATION

The denotification of around 500 sq.km. of the Melghat Wildlife Sanctuary in 1994 has drastically reduced the level of protection afforded to this area, with repercussions on the sanctuary itself. Even though the area remains under Project Tiger, it is accorded much less priority. Consequent to the denotification, several activities like dam construction and logging have been proposed.

Narmada River

- The Narmada and Tapi Rivers originate in the Satpuras
- Main tributaries of Narmada: Tawa, Denwa, Nagdwari, Malni, Koti, Sonbhadra and Bori.
- PAs in the catchments of these tributaries: Bori Sanctuary, Satpura National Park and Pachmarhi Sanctuary.
- The Tapi Basin extends over an area of 65,145 km², which is nearly 2.0% of total geographical area of the country.
- The Tapi is a rich source of alluvium and produces good agricultural soil.
- Main tributaries of Tapi: Purna, Girna, Panjhra, Vaghur, Bori and Aner, Sipna, Khapra, Gadga, Khandu and Dolar.

WILDLIFE TRADE

From the past seizures it seems that illegal trade in medicinal plants such as Musali *Chlorophytum tuberosum* and *Curculigo orchioides*, Ashwagandha *Rauvolfia serpentina* and others are on the rise. Among wildlife derivatives, bones and skins of tiger and leopard, deer antlers and bear bile are in demand and pose a constant threat.

What lies ahead?

For the long-term conservation of the Satpura landscape area, we need to look at protected areas and the regions surrounding them separately.

In PAs we need –

- To create inviolate areas by implementing "Voluntary relocation".
- To have effective wildlife conservation, protection and management practices.
- To implement wildlife conservation through specialised wildlife wing by allocating it proper manpower, sufficient resources and enough funds.
- To declare new sanctuaries and national parks.

Outside PAs we need –

- To declare selected areas as Ecologically Fragile under the Environment Protection Act.

And to identify still other areas for protection under the Community Conserved Areas category — Sec. 36A of the Wildlife (Protection) Act 2002. In the latter case, communities could participate in conservation and in turn win benefits including forest resources for bona fide use, as they used to in days gone by.

Protecting the Corbett National Park

(with help from the Central Empowered Committee)

RAJLIT LAJ/SANCTUARY



BY DEBI GOENKA, HON. TREASURER, BNHS

I was asked by the BNHS to travel to the Corbett Tiger Reserve (CTR), to observe and then report on a long standing problem concerning illegal encroachments on forest land. I have been involved in the protection and legal defence of our forests for over two decades now, but almost nothing prepared me for what I discovered in the backyard of India's first ever Tiger Reserve.

The BNHS has always been at the forefront of the battle to protect wild India, as can be seen from the extracts published elsewhere in this booklet, that were selected by Valmik Thapar from the pages of the Journal of the BNHS. It seemed particularly fitting therefore that, as recently as May 2003, the Society was co-opted by the Centrally Empowered Committee (CEC) as a "Special Invitee" to assist the CEC with regard to the escalating problem of encroachments within the Corbett National Park (CNP).

In my capacity as the Honorary Treasurer of the BNHS, I was requested to assist the CEC in its investigations. I visited the site between June 16-18, 2003, and submitted a detailed report to the CEC in the first week of July 2003.

The salient recommendations listed below in this report will provide a better idea of the scope of my recommendations. This is the manner in which we will need to sweep through our sanctuaries and national parks and force "peace" to prevail in our troubled wild havens. Apart from fulfilling their existing responsibilities, this I believe, is the task to which BNHS members, scientists and staff should dedicate themselves in the years ahead.

OBSERVATIONS

1. The existence of the encroachers as well as the Irrigation Colonies is definitely creating a serious problem for wildlife and wildlife habitats within the CNP/CTR. It is therefore necessary to ensure that all the encroachers and encroachments are removed immediately i.e. within one month.
2. Since the continued existence of the Irrigation Colonies within the CNP/CTR is also creating serious problems for wildlife and wildlife habitats, I also recommend that these colonies should be shifted out of the CNP/CTR in an urgent and time bound manner. The fact that this

area is now part of a notified National Park would mean that the provisions of the Wildlife (Protection) Act, 1972, as well as the recent orders of the Honorable Supreme Court of India pertaining to the protection of national parks and sanctuaries are now applicable to this area as well, and need to be enforced.

3. Until such time as the colonies are removed, the excess land available with the irrigation department should be immediately handed over to the forest department. This exercise may be carried out by a Committee comprising of the Irrigation Department, Revenue Department and Forest Department, as well as a member of the CEC.
4. The Irrigation Department may be asked to set up a check post at the gates of the colony so as to ensure that only bona fide residents and visitors are allowed inside the colonies.
5. The District Magistrate and the Superintendent of Police may be asked to take personal responsibility for ensuring that there is no law and order problem created by the encroachers.
6. No public meetings or functions should be permitted by the district authorities if they are to be held on Reserved Forest lands.
7. No loudspeakers should be permitted within the Reserved Forest areas.
8. All illegal or unauthorized water, electricity and telephone connections should be disconnected by the concerned departments. The Superintending Engineers may be made personally responsible for ensuring that this is complied with.
9. A Company of Police Armed Constabulary (PAC) may be deployed at the site under the control of the Director, Project Tiger to facilitate the removal of encroachments.
10. The Sub Divisional Magistrate (SDM) may be requested to dispose of the cases under the encroachers in a time bound manner. This could be done by clubbing the cases together or by any other means within the legal framework.
11. Alternatively, a special officer could be appointed for the limited purpose of hearing these cases on a day to day basis.
12. All domestic livestock shall be removed forthwith from the Reserved Forest areas by the Irrigation Department with the help of the police.
13. All non-operational staff must be shifted out of the Reserved Forest area within three months.
14. All operational staff whose presence is essential shall be relocated to the Irrigation Colony outside the CNP within 6 months.
15. All wire fencing, boundary walls, houses and structures constructed within the CNP area should be

demolished by the Irrigation Department after they are vacated, and the debris and other material shall be removed and disposed off on non-forest land. All wells and pits shall be filled up, unless required by the Forest Department.

16. All ornamental gardens, garden furniture, wire fencing, boundary walls, etc. that are creating obstacles for wildlife around the Saddle dam and Main Dam areas should also be removed by the Irrigation Department within three months.
17. The site should be rendered safe and habitable for wildlife, and funds should be provided by the Irrigation Department as committed in letter no. 903 (i)13-11 dated August 22, 1966 from the Conservator of Forests, Western Circle, U.P., to the Sahayak Sachiv, Van (Kha) Vibhag, U.P. The amount of Rs.1.25 crores that was supposed to be given in 1966 to the Forest Department should be immediately transferred along with the overdue interest to a separate bank account that shall be opened by the Director Project Tiger in any nationalized bank. These funds could be used exclusively for the protection and conservation activities of the CNP, and would be subjected to the normal account and audit procedures of the State Government.
18. In case the Irrigation Department wishes to continue its activities within the ecologically sensitive and fragile environs of the CNP after six months, they could be asked to deposit a sum of Rs.1.27 crores per hectare per year (or part thereof) with the Director CNP, for the land retained by them within the CNP.

From what we understand the BNHS report has been accepted *in toto* by the CEC. And subsequent to the submission of this report, the Irrigation and Forest Departments have already carried out demolitions for the removal of encroachers within the CNP.

This kind of action is sure to send signals to other would be encroachers and will hopefully help to staunch the rot that had been allowed to seep into the arena of forest protection over the years.

A copy of the BNHS site visit report can be downloaded from the BNHS website www.bnhs.org



HORA BUNJABI SANCTUARY

Tungreshwar – the future of water security

by Deepak Apte



I have been to Tungreshwar often and it seems impossible to believe that the thick glades, flowing waters and vibrant wildlife can co-exist within a stone's throw from a bustling highway and human disturbance. But nature is alive here. No sooner do you enter its confines that birdsong fills your ears and botanists could ask for few better examples of a moist evergreen forest.

When I trekked to the highest point (570m) I saw the canopy stretch northward towards the Tansa valley and I prayed that better sense would prevail and that the fragile corridors connecting Tungreshwar with Tansa would be restored, rather than snapped.

Studded with deciduous patches that only add to the biodiversity value, Tungreshwar harbours perennial water sources and this is why wildlife densities are likely to be high, provided we are able to offer the area the peace and seclusion it needs.

Records in the BNHS suggest that the forest hosts over than 600 species of plants, over 250 species of birds, 150 species of butterflies, over 36 species of herpetofauna and many more yet to be documented. The area is also important for owl moths from the genus *Oithreis* (seven species). It is also the largest breeding site for the atlas moth *Attacus atlas* around Mumbai. The leopard *Panthera pardus* is the predominant predator and thrives on spotted deer *Axis axis*, barking deer *Muntiacus muntjak* and sambar *Cervus unicolor*. It was as recently as May 2003 that a tiger

MAP NOT TO SCALE



Panthera tigris was reported from Tungareshwar.

Besides its immensely high biodiversity potential, this magical forest also acts as vital catchment area, which helps to recharge thousands of freshwater wells in the Vasai Taluka. The water security of this entire region depends on this forest and its natural surrounds.

CONSERVATION ISSUES

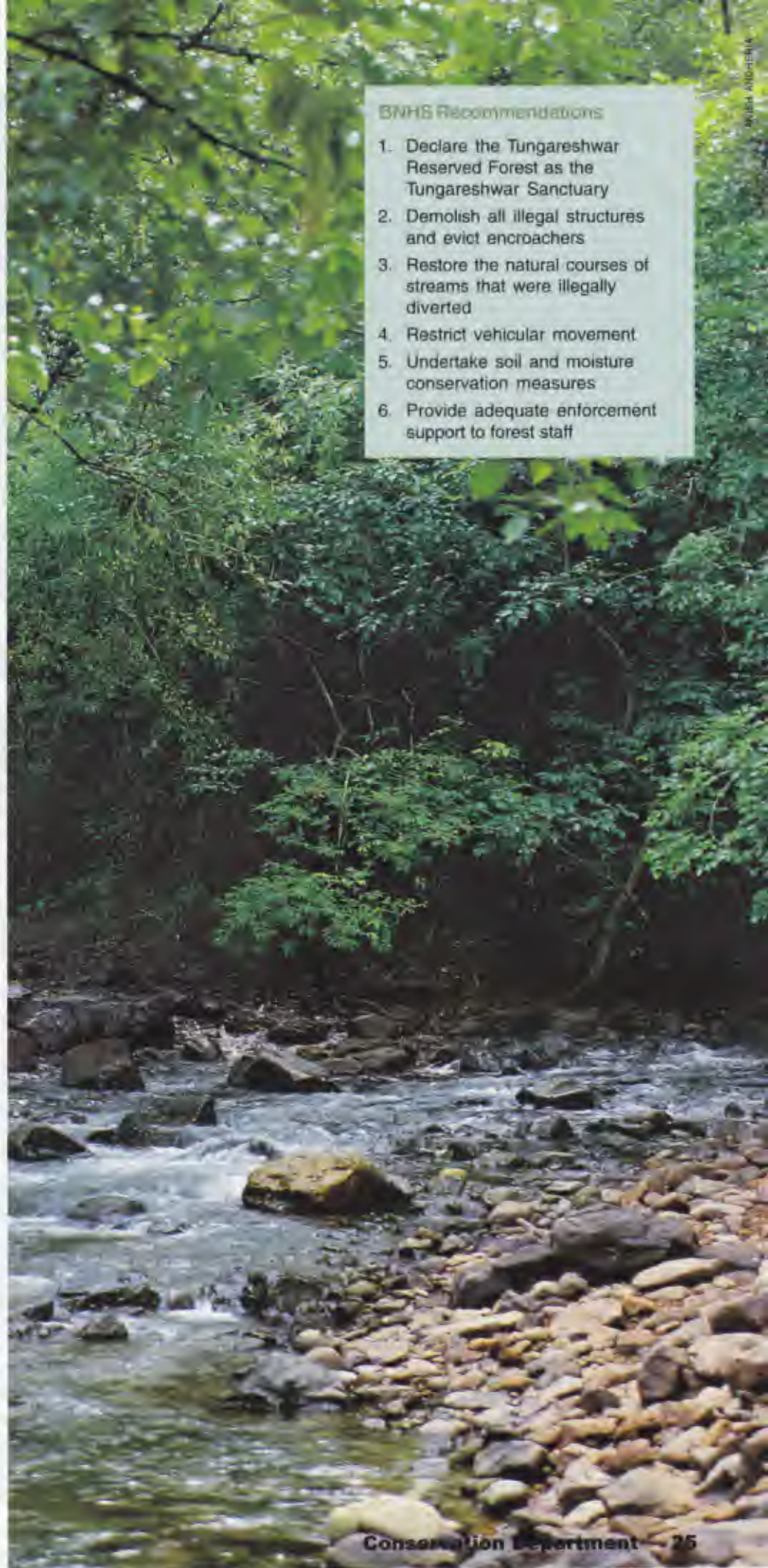
Over last few years, the systematic and illegal expansion of roads and illegal diversion of natural streams has threatened this biodiversity rich area. A cart tract (from Sativali to Tungareshwar Mandir) as shown in forest topographical sheets has now been illegally converted into a 20m wide road that provides vehicle access to all and sundry. This road further continues to Sadanand Baba's ashram and needs to be further investigated for violation of the Forest (Conservation) Act 1980.

The course of three natural streams has been diverted by blasting the streambed to remove large rocks and to provide uninterrupted access to vehicles throughout the year. This is banned in Reserved Forest Areas. Another road from Parol to Sadanand Baba's ashram, once a pristine forested tract, has now been converted into a 10m wide road and is another blatant example of a FC Act violation. When we undertook a walking survey, we estimated that thousands of trees must have been hacked to expand the road along its 15 km length from Sativali to the ashram and another seven kms from Parol to ashram. The two-storied ashram building and its attendant infrastructures need to be investigated for its legal status.

The Conservation Department of the BNHS has organized several trips to this forest and has spearheaded a sustained campaign against these illegalities in the Tungareshwar Reserved Forest. We have also lobbied persistently with the forest and administration authorities of the Maharashtra Government. Representations made to the Ministry of Environment and Forests at the Centre, the State Forest Department and the Central Empowered Committee on this issue look like they might just yield results.

BNHS Recommendations

1. Declare the Tungareshwar Reserved Forest as the Tungareshwar Sanctuary
2. Demolish all illegal structures and evict encroachers
3. Restore the natural courses of streams that were illegally diverted
4. Restrict vehicular movement
5. Undertake soil and moisture conservation measures
6. Provide adequate enforcement support to forest staff





Marine National Park, Gulf of Kutchh:

A conservation challenge

Gulf of Kutchh is an ecological miracle. A complex coral reef ecosystem, coupled with extensive mangroves, dominates the landscape of the shallow waters of the Marine National Park, the first in India to be dedicated to the protection of our threatened marine flora and fauna.

Today the entire coastline is threatened by a combination of mangrove destruction, oil spills, toxic waste and reclamation. Yet, somehow, the region continues to support marine life. Nature is not quite as helpless as we might imagine.

I remember early days of my shell expeditions in 1980's to these coastal areas. The coral reefs of Narara, Pirotan, Poshitra and Beyt Dwarka always fascinated me. Their vibrant colours, shapes and myriad forms were attractive no doubt, but even more absorbing was the question of their ancient origins, the purpose of their shapes and sizes. I will never forget the stunning threat-display of an octopus that I chanced upon in the shallows, and its subsequent ability to change colours, to merge with the background. Wading further out from the tide line, I saw elegant crests of brain coral, magnificent architecture of moon and plate corals and shoals of reef fish swimming among them. I was mesmerised and in me was born a determination to understand this ecosystem better and protect it as best I could.

My subsequent expeditions were equally rewarding. I saw cowries (*Cypraea* sp.), wentle traps (*Epitonium* sp.) and rock shells (*Murex* sp.) and then returned to spend

hours studying their origins, the way they found food and how they avoided the dangers always lurking in the shape and form of predators.

Wading through cold, ankle deep water in winter was a simple pleasure that was not merely pleasurable, but rewarding to boot. It was always easy to see large sand anemones in their various hues of green, brown and blue. Pirotan at sunset was intoxicating. Sitting on the beach and staring out across the sands, I was treated to a veritable orchestra of colours and calls. The deep purple of Reef Herons (*Egretta gularis*), the majestic pink of Flamingoes (*Phoenicopterus ruber*), elegant Avocets (*Recurvirostra avosetta*) and ever-busy Little Stints (*Calidris minuta*) were my constant companions. Come evening and many more water birds including ducks would pick their favourite roosts. And nothing seemed capable of tiring the terns and gulls that seemed to dominate the seashore. When I got tired of watching Grey Herons (*Ardea cinerea*) and the teeming flocks of waders, I would peer through my binoculars and sometimes be blessed by the sight of dolphins that hunted fish and octopus just offshore.

Mangroves of the Gulf of Kutchh are the only mangroves that exists in the Gujarat state. These magical plants in turn support huge breeding colonies of painted storks (*Mycteria leucocephala*), herons, egrets, ibises, spoonbills (*Platalea leucorodia*), darters (*Anhinga melanogaster*) and little cormorants (*Phalacrocorax niger*).

This marine ecosystem represents an economic asset that our planners and developers have, sadly, not recognized. Corals, sandbars, mangroves and dunes are the best defences against the wrath of the oceans. These land-sea frontiers are the breeding grounds of perhaps over 70 per cent of all marine creatures, upon which our own food security is dependent. Yet we find short term profiteers have been allowed to rip these natural wonders apart. Little wonder Gujarat now suffers the constant threat of cyclone damage, sea erosion and falling fish catch.

Today my work with the BNHS, as its Conservation Officer, provides me with an opportunity to share my fascination and love for the marine world with children and adults alike and it also permits me to join hands with those who are willing to fight to protect this irreplaceable heritage.

LOCATION

The Gulf of Kutchh is an arm of the Arabian Sea, separating the Saurashtra Peninsula from the Great and Little Rann of Kutchh. At its seaward (western) end it is 58 km wide, from which point it tapers gradually eastwards, extending for nearly 170 km with maximum depth of 60 mts and an average depth of about 20 mts. Most of the beaches are sandy and muddy, or have large sandstone expanses.

The Marine Sanctuary and National Park are situated, on the southern shore of the Gulf of Kutchh. They were established in 1980 and 1982 respectively under the provisions of the Wildlife (Protection) Act, 1972. The Sanctuary extended over an area of 270 sq. km., from Okha to Jodhya. The core area of 110 sq. km. was subsequently notified as a Marine Park, comprising areas of 7,000 ha off Okha in the west and 4,000 ha off Jamnagar to the east.

In 1982, this protected area was enlarged to over 400 sq. km. There are between 30 and 40 islands on the Jamnagar coast in the Marine National Park, all surrounded by reefs. The best-known islands are, of course, Pirotan, all of six sq. km. (16 km. north of Bedi Port) and Karubhar.

CONSERVATION ISSUES

In the past three decades, rampant extraction of corals and sand by the cement industry has left deep scars on this fragile ecosystem and has caused substantial destruction leading to increased turbidity. I believe this is the main reason for the sharp decline in marine life. At places like Narara and Pirotan the damage is probably beyond repair. As if this were not enough, a series of refineries have been inflicted on us by the Indian Oil Corporation, ESSAR, Reliance and, we now understand, few more may be joining the fray. Operational ports such as New Port, Ruchi, Bedi, Kandla, Mundra and Navlakhi were built without appropriate environment impact studies. Naval ports including Valsura and Kargil and the proposed Poshitra add to the woes of the beleaguered marine life. Several chemical and salt industries dump effluents into once pure waters. And to add to this mayhem, is the anthropogenic pressure from as many as 3,000 mechanized fishing crafts. The biodiversity of Gulf of Kutch is under fullscale assault.

The supposedly benign salt industry has actually stripped the coastline of its mangroves and is a key reason for human deaths that now take place when cyclones strike.

Sand anemones, pearl oysters (*Pinctada vulgaris*), sacred chanks (*Xancus pyrum*) and brain corals have vanished from Narara, perhaps the worst hit of all the regions. On a recent visit, all I saw was dead coral debris. The sea is waiting for *Homo sapiens* to pass, I thought to myself, before it reclaimed what was rightfully its own.

CONCLUSION

While children continue to be taught about nature, marine ecosystems and the impact of ecological disharmony, influential people continue to abuse their power to tear and rip at the innards of Gujarat's marine wonderland. Several actions initiated by the Gujarat Forest Department are serving to delay, or thwart the damage and this includes mangrove plantations, educational camps, and restricted tourist access to few islands, so that word of mouth support spreads. Clearly, however, this is inadequate.

The BNHS is in touch with potential partners and supporters to protect this western seaboard and its associated coral, mud and mangrove habitats.

Apart from imparting nature education to all sectors of society from children to industrialists, we have honed in on five priorities:

1. A moratorium on further reclamation and/or destruction of coastal ecosystems.
2. Tight control over mechanized fishing in the Gulf of Kutchh.
3. An effective disaster mitigation plan particularly for oil refineries and chemical industries, with appropriate fund allocation made over to ecological restoration projects.
4. Better surveillance and enforcement infrastructure for forest department and coordinated action with the Coast Guard and Indian Navy.
5. Control over illegal sand mining.

Deepak Apte, Conservation Officer, BNHS

BIODIVERSITY	
Particulars	Species Diversity
Algae	108
Corals (Hard & soft)	56
Sponges	70
Fishes	200
Prawns	27
Crabs	30
Molluscs	400 +
Turtles	3
Sea snakes	3
Birds	175
Mammals	3



“— at the back of all this senseless slaughter and law breaking which has brought about the present sorry plight is the apathy of public opinion towards the need for the preservation of our fauna.”

Dr. Salim Ali

BNHS Centenary Journal Seminar
Mumbai, November 12 – 15, 2003

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